DOCUMENT RESUME

ED 206 396 PS 012 366

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TITLE Reflection-Impulsivity and Social Reasoning.
SPONS AGENCY Ontario Mental Health Foundation, Toronto; Social Sciences and Humanities Research Council of Canada, Ottawa (Ontario).
PUB DATE May 80
NOTE 23p.; Portions of this paper were presented at the Biennial Meeting of the Southeastern Conference on Human Development (5th, Atlanta, GA, April, 1978) and the Waterloo Conference on Child Development (Waterloo, Ontario, Canada, May, 1980).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Processes; Cognitive Style; Comparative Analysis; *Conceptual Tempo; *Decision Making; Elementary Education; *Elementary School Students; Foreign Countries; Grade 1; Grade 2; Males; Personality Traits; Problem Solving; *Reaction Time; *Social Behavior; Student Behavior
IDENTIFIERS Canada; Matching Familiar Figures Test (Kagan); *Social Reasoning

ABSTRACT

The major purpose of this study was to assess the degree to which cognitive style, as indexed by the Matching Familiar Figures Test (MFFT), is related to the way in which children respond to problems with social or interpersonal content. Fifty-two reflective and 64 impulsive first- and second-grade boys were presented with a number of stories in which one of the characters was faced with a decision as to how to react to other people in a variety of conflict situations. A number of different types of responses were presented to each child who was required to select the one he considered most appropriate. To further examine the relationship between cognitive style and various social behaviors and personality characteristics, a teacher-rating scale was completed by the subjects' teachers (N=13). Each child was rated on six different dimensions of classroom behavior: aggression, need achievement, anxiety, academic disability, isolation, and extraversion. Results indicated that the impulsive boys consistently responded more quickly than did the reflectives. Also, the impulsives considered yielding to be an appropriate response to social conflict more frequently than did the reflectives, while the reflectives viewed assertive behavior or direct confrontation to be more appropriate than did the impulsives. Teacher ratings on Miller's (1972) School Behavior Checklist yielded no differences between the two cognitive style groups on any of the six classroom behavior measures. (Author/MP)

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Reflection-Impulsivity and Social Reasoning

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Running Head: Social Reasoning

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This research was supported by doctoral fellowships from the Ontario Mental Health Foundation and the Social Sciences and Humanities Research Council of Canada. This article is based on the junior author's Masters thesis in the Department of Psychology at Queen's University. Portions of this paper were presented at the Fifth Biennial Meeting of the Southeastern Conference on Human Development, Atlanta, April, 1978 and the Waterloo Conference on Child Development, Waterloo, May, 1980. Requests for reprints should be sent to R. DeV. Peters, Psychology Department, Queen's University, Kingston, Ontario, Canada, K7L 3N6.

ABSTRACT

Fifty two reflective and 64 impulsive first- and second-grade boys were administered a social reasoning task consisting of six social conflict situations. Measures were taken of the types of responses to conflict which the children considered to be most appropriate and also decision latencies. The impulsive boys responded consistently more quickly than the reflectives. Also, the impulsives considered the response of yielding to be an appropriate response to social conflict more frequently than did the reflectives ($p<.001$), while the reflectives viewed assertive or direct confrontation to be more appropriate than did the impulsives ($p<.05$). Teacher ratings on Miller's (1972) School Behavior Checklist yielded no differences between the two cognitive style groups on measures of aggression, anxiety, need achievement, extraversion, academic disability or hostile isolation. The fact that reflectives evidenced a slower, more direct approach than the impulsives on the social reasoning task is consistent with cognitive style difference which have been found on non-social problem-solving tasks and extends the potential relevance of the reflection-impulsivity dimension to social reasoning.

Reflection-Impulsivity and Social Reasoning

The term cognitive style refers to individual differences and intra-individual consistencies in cognitive functioning (Kagan and Kogan, 1970). One such cognitive style dimension which has recently received considerable interest is the degree to which a person pauses to evaluate his cognitive products in situations of response uncertainty. This construct, known as reflection-impulsivity, was operationally defined by Kagan, Rosman, Day, Albert and Phillips (1964) as the combination of two correlated dimensions, response latency and accuracy, on the Matching Familiar Figures Test (MFFT), which is a complex matching-to-sample task. Based on MFFT performance, cognitive impulsivity refers to the tendency to respond quickly and innaccurately while reflection involves slower and more accurate performance.

Research on reflection-impulsivity has tended to concentrate primarily on cognitive tasks which are associated with academic performance. A substantial body of research now exists which demonstrates differential performance by reflective and impulsive children on a wide range of cognitive/academic tasks including inductive reasoning (Kagan, Pearson and Welch, 1966), concept shifts (Peters, 1979), perceptual learning (Odom, McIntyre and Neal, 1971), conservation (Barstis and Ford, 1977) and visual analysis skills (Zelniker and Jeffrey, 1976). Both Messer (1976) and Wright and Vlietstra (1977) have recently reviewed this literature.

Huston-Stein, Susman and Friedrich (Note 1) observed that "while cognitive style falls theoretically somewhere between cognition and personality ...most of the research on reflection-impulsivity has been concerned with its relationship to cognitive performance" (p. 1). The question naturally arises as to whether individual differences in reflection-impulsivity are related to either performance on social reasoning tasks or to differences in social behavior. Relatively little research has examined these questions. In general, according to Kagan & Kogan (1970), cognitive style investigators have tended to down-play "the critical and

complementary roles of the social and impersonal environments" (p. 1352). As well, few. except for Spivack and his colleagues (e.g., Spivack, Platt and Shure, 1976) have stressed the necessity to distinguish between the reasoning processes required in impersonal and interpersonal situations. Thus, researchers (e.g. Camp, 1977) have assumed, without empirical justification, that cognitive impulsivity should be inexorably expressed as behavioral impulsivity.

One approach to investigating the possible impact of cognitive style variables on social processes has arisen out of recent research on the general question of how children think about their social worlds, an area referred to as social cognition (Chandler, 1977; Shantz, 1975). A major assumption underlying social cognitive research is that the processes which affect the way in which children think or reason about social information constitute an important set of influences on their social behavior. Consequently, a number of investigators have explored the relationship between reflection-impulsivity and a variety of social reasoning tasks.

Schliefer and Douglas (1972) found that six-year-olds who demonstrated more mature forms of moral reasoning showed longer MFFT latencies and were rated by their teachers as more attentive and reflective than children showing immature moral reasoning. Campbell and Douglas (1972) found that reflective 6-, 8-, and 10-year-old boys tended to choose optimistic endings, while impulsives chose pessimistic endings, in a story completion test aimed at eliciting responses to the threat of frustration. The authors interpreted this to indicate an active attempt by the reflectives to modify the frustrating events, as opposed to either a failure to deal with these events or a passive acceptance of the inevitable by the impulsives. Berzonsky (1974) found that reflective six- and seven-year-olds showed more mature animistic-thinking than impulsives and Glenwick and Burka (1975) found a significant relationship between MFFT performance and role-taking ability in fourth-grade boys but not girls. This latter finding

however was not replicated by either Rubin (1978) or Miller and Leahy (Note 2) who found role-taking ability in school-aged children to be unrelated to MFFT performance.

A second general approach to examining the possible influence of cognitive style on social functioning has been to compare various measures of personality characteristics and social behavior for impulsive and reflective children. Block, Block and Harrington (1974) studied teacher ratings of the personality characteristics of nursery school children and found that the most impulsive (i.e. fast and inaccurate on the MFFT) children were rated as anxious, hypersensitive, vulnerable and structure-seeking whereas the reflective (slow, accurate) children were rated as reasonable, calm, considerate and interpersonally mature. Huston-Stein et al. (Note 1) collected classroom observations of preschoolers involved in Head Start programs and found that reflective children were more aggressive, more assertive and more likely to show understanding of others and engage in prosocial behavior than impulsive children.

Ault, Crawford and Jeffrey (1972) found that reflective third- and fourth-grade children were rated by teachers as higher in attention and lower in hyperactivity than impulsive children but not different in motivation to learn. Unfortunately, the results of the Ault et al. (1972) study were confounded with the sex of children. McKinney (1975) similarly found that reflective subjects (in grade two) were rated by their teachers as more attentive and less distractable than impulsives. Glenwick, Barocas and Burka (1976) reported a relationship between MFFT performance and teacher ratings in fourth-grade boys, with the more impulsive boys being rated as higher in acting out, moodiness and learning difficulties. Similar results were found for girls only on the ratings of learning difficulties. Glenwick et al. also found that reflective performance on the MFFT was associated with greater peer popularity, although here again, the findings were stronger for boys than girls.

On the other hand, Bjorklund and Butter (1973) found no differences between reflective and impulsive fourth graders on either teacher ratings of hyperactivity

or self ratings of impulsivity. Bentler and McClain (1976) collected teacher-, peer-, and self-ratings on extraversion, test anxiety, impulsivity and academic achievement motivation on fifth-grade children. Although the types of ratings showed a high degree of consistency among themselves, there was no relationship between these ratings and MFFT performance. Sergeant, van Velthoven and Virginia (1979) recently reported no relationship between teacher and "blind" observer ratings of hyperactivity and MFFT performance in children between the ages of 8 and 12, and Moore, Haskins and McKinney (1980) studying 9-11 year olds, found no differences between reflective and impulsive children on a variety of classroom behaviors, including attending, distraction and aggression.

In summary, individual differences in the cognitive style dimension of reflection-impulsivity have been found to be related to the quality of performance on a wide variety of non-social problem solving tasks, indicating that reflectives tend to be more careful and accurate in their performance than impulsives. The few studies which have examined the relationship of this cognitive style with social reasoning or personality characteristics have yielded inconsistent results. There is some suggestion that reflectives may be more attentive, more assertive and aggressive, and less anxious than impulsives, while there is little indication to date of any consistent differences in more molar personality characteristics such as achievement motivation, test anxiety, extraversion, behavioral impulsivity or hyperactivity.

It should be noted that the particular social reasoning tasks which have been utilized in the research with reflection-impulsivity, viz. moral reasoning, animistic thinking and role taking tasks, have been selected because of an hypothesized relation between cognitive impulsivity and the Piagetian process of egocentric thinking. That is, the research was designed to determine whether impulsive children would have more difficulty than reflectives reasoning about the intentions or perspectives of others. The equivocal findings suggest that impulsivity may not be strongly related to egocentric thought. As well, researchers such as

Damon (1979) and Frome-Paget (Note 3) have recently criticized the overemphasis on egocentrism and other aspects of mathematical-physical cognition advocated by Piaget which they claim has restricted the research focus in the area of social cognition. A more profitable approach to studying the impact of reflection-impulsivity on social reasoning might be to employ tasks which bear a more direct relationship to actual social behavior.

A major purpose of the present study was to assess the degree to which cognitive style, as indexed by MFFT performance, is related to the way in which children respond to problems with social or interpersonal content. First- and second-grade boys were presented with a number of stories in which one of the characters was faced with a decision as to how to react to other people in a variety of conflict situations. A number of different types of responses were presented to the child and he was required to select the one which he considered more appropriate. In this way, we hoped to provide a more sensitive test of any differences in social cognition that might exist between reflective and impulsive children than that provided by previous research, which has concentrated on measuring differences in egocentric thought.

First and second grade boys were selected as the target population for several reasons. First, previous research has demonstrated that, due to a low correlation between MFFT latency and error scores prior to the age of five, the reflection-impulsivity dimension is of questionable validity during the preschool years. Secondly, although very few sex differences in reflection-impulsivity have been found on nonsocial problem solving tasks, correlations between various social behavior measures and MFFT performance have consistently been stronger for boys than girls.

A second purpose was to further examine the relationship between cognitive style and various social behaviors and personality characteristics. Consequently, we included a teacher rating scale on which each child was rated on several different dimensions of classroom behavior including aggression, need achievement, anxiety academic disability, isolation and extraversion.

METHOD

Subjects

The subjects were 116 boys in grades 1 and 2 in a small community with a population of approximately 35,000. The boys ranged in age from 77 to 124 months with a mean of 93 months. The IQ of the subjects, as indexed by the Peabody Picture Vocabulary Test (PPVT), ranged from 78 to 169 with a mean of 108.

Materials

a. The Matching Familiar Figures Test (MFFT). This complex matching to sample task, developed by Kagan et al. (1964), consists of 2 practice and 12 test items. Each item contains a standard picture of a common object (e.g. a tree) and six comparison pictures, all but one of which differ from the standard in one or more details. The child is asked to select the picture which exactly matches the standard. He is allowed to make up to six errors per item. Latency to first response on each of the twelve items and total number of errors are recorded.

b. The Social Reasoning Inventory (SRI). This social reasoning task was developed for the present study from the paper and pencil tasks used by Leifer and Roberts (1972) and Collins (Note 4). The SRI consists of six brief vignettes, each describing a child finding himself in a social conflict situation (e.g. a boy is waiting in line to get a drink from the water fountain when another boy pushes in front of him). After hearing each story, the subject is asked what he would do in that situation. For each story, six different types of responses are presented to the child two at a time, accompanied by a cartoon drawing which depicts the behavior. The six types of responses are: physical aggression (e.g. hitting, kicking), verbal aggression (e.g. name calling), yielding (e.g. saying "that's all right"), leaving the field (e.g. going away from the situation), authority appeals (e.g. telling the teacher) and assertive (e.g. asking the child to wait his turn).

The paired presentation of each type of response with every other type, resulted in 15 response pairs for each of the six situations. The experimenter recorded the type of response which the child selected and the time taken to make each choice.

The generality of the response latency dimension from MFFT to SRI performance was also examined in the present study. Latency scores for the social reasoning task were derived by computing the mean latency with which each of the six different types of responses were selected, averaged over the six stories. A grand mean latency score for all choices was also computed for each subject. Choice scores on the SRI were likewise computed by determining the mean frequency with which a subject chose each of the different types of responses averaged over the six stories. The choice scores for each response type thus ranged from a minimum of zero to a maximum of five.

c. The School Behaviour Checklist (SBCL). The SBCL is a teacher-completed inventory which contains 96 classroom behaviors (Miller, 1972). From these ratings, each child receives a score on six factor-analytically derived subscales: aggression, anxiety, need achievement, hostile isolation, extraversion, academic disability plus a total disability score which is derived from all but one of the 96 items.

Procedure

The children were individually administered the MFFT, the PPVT IQ test and the SRI social reasoning task by an adult male experimenter in one session which lasted approximately 45 minutes. Testing was carried out in a quiet room provided by the school. The children were drawn from 13 different classrooms in six elementary schools.

The SBCL was completed by the 13 teachers approximately two months prior to the testing of the children. The teachers were unaware of the nature of the study or the types of individual tests which were employed until after the

study was completed. Also, the experimenter was unaware of the teacher's ratings when administering the individual tests.

The most frequently used procedure for forming reflective and impulsive groups based on MFFT performance has been to perform median splits on both the error and the latency scores. Reflective sbuejcts are then identified as those who fall above the latency median and below the error median (i.e. are slow and accurate), whereas impulsives are those who fall below the latency median and above the error median (i.e. are fast and inaccurate). This procedure has been criticized by Ault et al. (1976) on several grounds including loss of data and subsequently power by eliminating the fast-accurate and slow-inaccurate subjects who constitute approximately 1/3 of the total sample in most studies. Some researchers (e.g. Block et al. 1974) have argued for the inclusion of the fast-accurate and slow-inaccurate groups in MFFT studies. Although the four-quadrant procedure has some intuitive appeal, the relationship of the fast-accurate and slow-inaccurate groups to the uni-dimensional construct of reflection-impulsivity is conceptually vague.

A more promising method of handling MFFT data which eliminates the problems inherent in the dual median split procedure has been proposed by Salkind and Wright (1977). This procedure involves the transformation of time and error scores to a univariate, continuous variable called an impulsivity (I) score. The I score is defined as the standard score for errors minus the standard score for latency. On this basis, subjects with positive I scores are identified as impulsive and those with negative I scores as reflective and all subjects in a given sample are included. In addition, Ault et al. (1976) and Messer (1976) suggested that a multiple regression analysis is most appropriate for MFFT data since it allows for latency and error scores to be employed as continuous variables.

For the present data, the results of the SBCL and SRI choice and latency

scores were analyzed using the dual median split, the I score and multiple regression procedures. These various procedures are discussed in greater detail in a separate paper (Note 5). However, the conclusions yielded by these separate analysis procedures on the present data were equivalent. Consequently, only the results yielded by Salkind and Wright's I score procedure will be presented.

RESULTS

a. Matching Familiar Figures Test (MFFT). The total number of errors and latency to first response scores for each child on the MFFT was converted to an Impulsivity (I) score according to the formula $I = (Z_{error} - Z_{latency}/2)$. Children who received positive I scores constituted the impulsive group and those with negative I scores constituted the reflective group. This procedure resulted in 52 of the boys being classified as reflective and 64 as impulsive.

The correlation between MFFT errors and latency, $r[114] = -.56$, $p<.001$ was identical to that reported by Salkind (Note 6) and indicates that, in general, those children who responded slowly were more accurate than those who responded quickly. The MFFT error and latency scores for all subjects, with means of 16.41 and 9.59 respectively, indicated that the present sample was slightly more impulsive than the normative standard for eight-year-old boys established by Salkind, with means of 13.05 and 12.98 respectively.

Analyses of the CA and IQ scores between the reflective and impulsive groups failed to indicate significant differences in either variable ($F[1,114] = .32$, $p>.05$ for IQ; $F[1,114] = 2.71$, $p>.05$ for CA).

b. The Social Reasoning Inventory (SRI): Latency Scores. The latency means and standard deviations on the SRI for the reflective and impulsive groups are presented in Table 1.

Insert Table 1 about here

Analyses of these results indicated that the impulsives made significantly faster decisions than the reflectives on all types of choices on the social reasoning task except for physical aggression.

c. The SRI: Choice Scores. The means and standard deviations of the SRI choice scores for the two cognitive style groups are presented in Table 2.

Insert Table 2 about here

The analysis of these results indicated two significant differences: the reflectives showed more Assertive choices than the impulsives, while the impulsives gave substantially more Yielding responses than the reflectives. By examining the means in Table 2, it can also be seen that both cognitive style groups showed the same relative choice performance for the various categories. Assertive Behaviour was most frequently chosen by both groups followed by Yielding, Authority Appeals, Leaving the Field and finally Verbal and Physical Aggression. Thus the significant group differences appeared on the two most frequently chosen responses, with reflectives showing a much greater preference for Assertive than Yielding responses ($\bar{X}s$ = 3.99 vs. 3.03 respectively), while the impulsives chose the Yielding responses nearly as frequently as Assertive Behaviour ($\bar{X}s$ = 3.66 vs. 3.78 respectively).

Although none of the analyses of the group differences for the other types of choices reached significance, it is noteworthy that the two least frequently chosen categories of Verbal and Physical Aggression were chosen more frequently by the reflectives, a difference which approached significance ($p < .13$) for both types of responses. Authority Appeals and Leaving the Field were intermediate in overall frequency of choice and were essentially identical for both cognitive style groups.

d. The Teacher Ratings. Statistical analyses of the teachers' ratings of the two cognitive style groups on the School Behavior Checklist failed to

indicate any significant differences for the six measures, or for the Total Disability score.

DISCUSSION

Several aspects of the differential performance by the reflective and impulsive boys on the social reasoning task warrant discussion. First, the consistent latency differences demonstrated that the impulsives were making decisions concerning the appropriateness of various types of social behavior more quickly than reflectives. This finding suggests that individual differences in the speed with which a child responds may be a fairly general characteristic that influences performance in social as well as nonsocial situations. Since the few other studies which have examined cognitive style differences in social cognition did not measure response latency, the present finding warrants further investigation. However, the consistent and strong differences found in the present study are certainly suggestive of a generalized speed-of-response tendency in social as well as nonsocial reasoning.

In addition to the differences in speed of decision making for the social reasoning task, there were also several interesting differences in the type of responses which were considered most appropriate by the reflective and impulsive groups. These differences were most marked in the Yielding category. The impulsive group considered this type of response to be appropriate more frequently than the reflectives. Conversely, the reflectives viewed Assertive type responses to be more appropriate than did the impulsives. Also, there was some indication that the reflective boys viewed both verbally and physically aggressive actions to be more appropriate responses than did the impulsives.

In general, the results of the social reasoning task indicate that differences in cognitive style, as measured by MFFT performance, are associated with different approaches to social problem-solving. Reflectives tend to make decisions more slowly and favor a more direct or active approach to conflict

resolution, an approach involving confrontation, discussion and in some case aggression. Impulsives, on the other hand, tend to make decisions more rapidly than reflectives and favor behaviors which are more passive in nature.

These cognitive style differences in response to social conflict are congruent with the results reported by Huston-Stein et al. (Note 1) who found impulsive preschoolers to be less assertive and less aggressive than reflectives, and Campbell and Douglas (1972) who interpreted their results to imply that impulsive children were more likely to either fail to deal with frustrating events in a story or to passively accept the inevitability of such events. Also, Block et al. (1974) found that impulsive preschool children were rated by their teachers as anxious, hyperactive, vulnerable and structure-seeking, characteristics which are quite consistent with the more passive, yielding responding favoured by the impulsives in the present study. Taken together, these studies suggest that cognitive reflection may be associated with a direct, active approach to problem-solving situations while cognitive impulsivity appears to be characterized by a more passive, accommodating approach.

This analysis of reflection-impulsivity in terms of active-passive differences is consistent with the motivational interpretation suggested by Block et al. (1974) and by Kagan and Kogan (1970). Both of these analyses suggest that impulsivity may be associated with anxiety concerning one's competence or ability to perform adequately in an uncertain situation, while reflectivity may be associated with high levels of concern over the quality of one's performance in conjunction with a belief that one can in fact solve the problem. Thus, an impulsive style might induce a child to attempt to escape or withdraw from the problem-solving situation by quick responding and by yielding, whereas a reflective style would be associated with greater concern and effort over directly confronting the problem and attempting to reach an adequate solution.

Recent research (Peters, 1979; Zelniker and Jeffery, 1976) has indicated

that the reflection-impulsivity dimension is associated with individual differences in the type of information-processing strategies which children utilize in approaching certain problem solving tasks, with reflectives paying closer attention to fine stimulus details and impulsives using a more global, less differentiated approach. To the extent that these strategy differences extend to the processing of social information, one might expect cognitively impulsive children to be less sensitive to the often subtle cues in social situations which serve as discriminative stimuli for various types of responses and consequently tend to adopt more passive forms of behavior in social conflict situations. Cognitively reflective children, on the other hand, would be expected to make finer discriminations in processing social stimuli and consequently be better able to learn that more direct forms of response such as assertiveness and aggression are often reinforced.

What is being suggested here is that individual differences in various types of social behavior such as aggression, assertiveness and yielding, which have been demonstrated to be strongly influenced in young children by various social contingencies (e.g. Patterson, Littman & Bricker, 1967), may be, in part influenced by the type of information-processing strategy which children adopt in social situations.

This proposed analysis of social behavior in terms of differences in information-processing strategies, although receiving support in the present study by the differential performance of the reflective and impulsive groups on the social reasoning task, requires further investigation. The present study investigated the differential responding of reflective and impulsive boys in social reasoning but did not directly assess the information to which they were responding. Stronger support for the proposed influence of information-processing strategies on social behavior would result from studies which directly analyze the way in which reflective and impulsive children

process social information (i.e., whether differences exist in the type of information which is being attended to in social situations).

The finding in the present study of no differences between reflective and impulsive groups on the teachers' ratings of the general factors of aggression, anxiety, need achievement, extraversion, academic disability and hostile isolation corroborates previous research by Bentler and McClain (1976) which found no reflection-impulsivity differences in teacher-, peer-, and self-ratings on several global characteristics including extraversion, test anxiety and academic achievement motivation. However, some studies have found cognitive style differences in teachers' ratings of more specific behaviors such as attention, acting out, moodiness, and in peer ratings of popularity (Ault et al., 1972; Glenwick et al., 1976; McKinney, 1975). Others have found such differences in observers' ratings of assertive and aggressive behaviors (Huston-Stein et al., Note 1). Consequently, it appears that future research concerning the relationship between cognitive style and social behavior should utilize either ratings or direct observational measures of more specific behaviors, rather than general personality characteristics.

In summary, the finding that reflectives favored a slower, more direct approach while impulsives favored a faster and more passive approach on the social reasoning task is consistent with the cognitive style differences which have been found previously in nonsocial problem-solving tasks, and extends the potential relevance of the reflection-impulsivity dimension to the arena of social cognition and behavior.

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Table 1

Means and Standard Deviations of Reflective and Impulsive Groups for Latency Scores on the Social Reasoning Inventory (SRI)

Groups	Reflective (n=52)		Impulsive (n=64)		
	M	SD	M	SD	F (df)
SRI Category					
Physical Aggression	4.90[a]	1.55	4.49[b]	1.38	2.01 (1,102)
Verbal Aggression	5.39	1.44	4.57[c]	1.68	7.68 (1,113)**
Yielding	4.32	1.05	3.85	.66	8.83 (1,114)***
Authority Appeals	4.14	.99	3.73	.62	7.34 (1,114)**
Leaving the Field	4.01	.86	3.66	.65	6.01 (1,114)*
Assertive	4.75	.90	4.34	.61	8.46 (1,114)***
Grand $\bar{x}$	4.57	.85	4.11	.69	10.45 (1,114)***

Note. Twelve boys did not choose the physical aggression response and one boy did not make a verbal aggression choice on SRI. For these subjects, the latency measures for the relevant variables could not be analyzed and are labelled as "missing data".

[a] 7 "missing cases."

[b] 5 "missing cases."

[c] 1 "missing case."

*p <.05

**p <.01.

***p <.005.

Table 2

Mean and Standard Deviations of Reflective and Impulsive Groups for Choice Scores on the Social Reasoning Inventory (SRI)

Groups	Reflective (n=52)		Impulsive (n=64)		
	M	SD	M	SD	F[a]
SRI Category					
Physical Aggression	.96	.83	.73	.80	2.30
Verbal Aggression	1.30	.81	1.10	.59	2.27
Yielding	3.03	1.07	3.66	.85	12.45***
Authority Appeals	2.90	.64	2.92	.70	.88
Leaving the Field	2.80	.67	2.81	.50	.01
Assertive	3.99	.62	3.78	.56	3.82*

[a] df = 1,114

*p <.05

***p <.001